

Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) EP 0 913 789 A2

(12) EUROPEAN PATENT APPLICATION

(43) Date of publication:
06.05.1999 Bulletin 1999/18

(51) Int Cl.⁶: G06F 17/60

(21) Application number: 98308826.1

(22) Date of filing: 28.10.1998

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE
Designated Extension States:
AL LT LV MK RO SI

(72) Inventor: Neilsen, Jakob
Atherton, California 94027 (US)

(74) Representative: Read, Matthew Charles et al
Venner Shipley & Co.
20 Little Britain
London EC1A 7DH (GB)

(30) Priority: 31.10.1997 US 961984

(71) Applicant: SUN MICROSYSTEMS, INC.
Palo Alto, California 94303 (US)

(54) Pre-paid links to networks servers

(57) The author or sponsor of a document on a server may provide a hyperlink to content that requires payment to view or download. The author or sponsor can prepay for access to that content in a manner that is transparent to the end user. In one approach the author's document is generated dynamically when a user requests it. During the generation process a payment

token is inserted into hyperlinks to payment-required content to which the author or sponsor desires to permit free access. When the user selects a pre-paid hyperlink the remote server attempts to validate the payment token. If the token is valid then the content is provided to the end user and the author or sponsor is billed. If the token is not valid an error message is displayed.

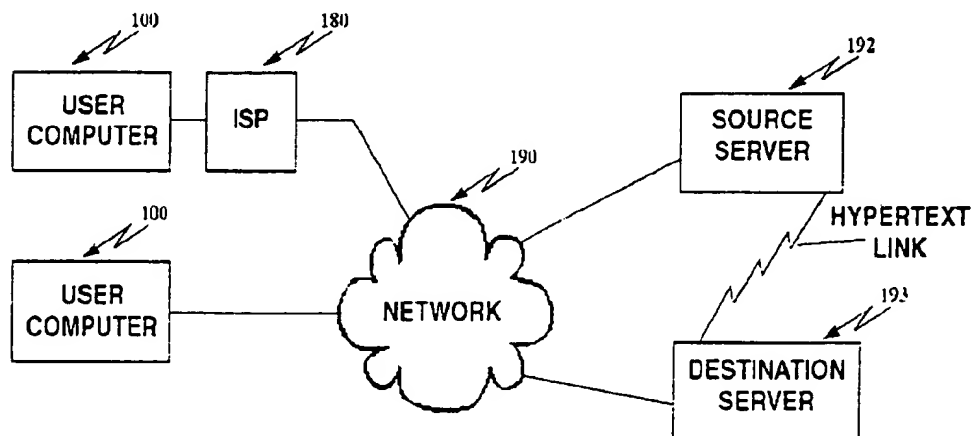


Figure 1D

EP 0 913 789 A2

Description

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] This invention relates to computer systems and more particularly to information retrieval systems operating over a network such as the Internet.

Description of Related Art

[0002] Owners of electronic content that can be accessed via a computer network may charge a fee to view or download their content. For example, users may be required to pay for a subscription in order to access an online newspaper or magazine. Access to other types of content (i.e., software, music, and videos) may require the user to pay a one time fee in order to view or download it. Many examples of subscription and one time payment-required content can be found on the World Wide Web.

[0003] Payment for access to information may take any form, such as; credit cards, checks, electronic cash, and smart debit cards. Payments that require the transmission of data (e.g., credit cards, electronic cash, and smart debit cards) typically make use of an encryption technique. Many encryption techniques, such as public-private key cryptography, are known in the art.

The Problems

[0004] Sponsors of websites, or similar sources of information on networks may want to provide users with hyperlinks to other online content, some of which may require a payment to view or download. For example, a World Wide Web page author or sponsor may want to provide a hyperlink to a newspaper article that reported favorably on his product. Therefore, to encourage users to visit a payment-required site, such an author or sponsor would like, in some cases, to enable a visitor to his network server (hereinafter website) to access the payment-required content for free. This capability has not been available in the prior art.

SUMMARY OF THE INVENTION

[0005] The invention provides methods, apparatus, systems, and computer program products which allow a document author or sponsor to provide a hyperlink, by which users can access content for free by prepaying for the access. When a user requests a document using a hyperlink to payment-required content, a payment token and optional parameters are appended to the hyperlink definition. A payment token is a string of data that may include details about the account to charge for the content and when access to the content should expire.

[0006] When a user selects a payment-required hyperlink, the token and parameter information are transmitted to the destination server for processing. If the token is valid then the payment-required content is transmitted to the user.

[0007] The processes described above are transparent to the user. The original document appears normal to the user and the user may not know that access has been granted to payment-required content. In an alternative embodiment the user may be notified that free access has been granted to payment-required content courtesy of the original sponsor or author.

[0008] The foregoing and other features, aspects and advantages of the present invention will become more apparent from the following detailed description of the present invention when taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The objects, features and advantages of the system of the present invention will be apparent from the following description in which:

[0010] Figure 1A is an illustration of a computer of a type suitable for carrying out the invention.

[0011] Figure 1B is a block diagram of an exemplary bus architecture suitable for carrying out the invention.

[0012] Figure 1C is an illustration of an exemplary memory medium for carrying program information and data for use in carrying out the invention.

[0013] Figure 1D is a block diagram of an exemplary network suitable for carrying program and data information useful for carrying out the invention.

[0014] Figure 2 is a flow chart of an exemplary process for making payment-required content available to users for free in accordance with one embodiment of the invention.

[0015] Figure 3 is a flow chart of an exemplary source page generation process for generating a server document with pre-paid links in accordance with one embodiment of the invention.

[0016] Figure 4 is a flow chart of an exemplary payment token generation algorithm in accordance with one embodiment of the invention.

[0017] Figure 5 is a flow chart of an exemplary destination server process for handling requested pre-paid content.

[0018] Figure 6 is a flow chart of one embodiment of a process for checking the validity of a pre-payment token and issuing an appropriate response.

[0019] Figure 7 is a flow chart of one embodiment of a process for honoring a valid pre-payment token.

[0020] Figure 8 is a flow chart of one embodiment of a process for maintaining a server pre-payment token database.

[0021] Figure 9 is an example of a hyperlink with a customer identifier parameter and a pre-payment token.

[0022] Figure 10 is an example of a pre-payment to-

ken that includes the customer identifier, the token counter value, and the token expiration date and time.

NOTATIONS AND NOMENCLATURE

[0023] The detailed descriptions which follow may be presented in terms of program procedures executed on a computer or network of computers. These procedural descriptions and representations are the means used by those skilled in the art to most effectively convey the substance of their work to others skilled in the art.

[0024] A procedure is here, and generally, conceived to be a self-consistent sequence of steps leading to a desired result. These steps are those requiring physical manipulations of physical quantities. Usually, though not necessarily, these quantities take the form of electrical or magnetic signals capable of being stored, transferred, combined, compared, and otherwise manipulated. It proves convenient at times, principally for reasons of common usage, to refer to these signals as bits, values, elements, symbols, characters, terms, numbers, or the like. It should be noted, however, that all of these and similar terms are to be associated with the appropriate physical quantities and are merely convenient labels applied to these quantities.

[0025] Further, the manipulations performed are often referred to in terms, such as adding or comparing, which are commonly associated with mental operations performed by a human operator. No such capability of a human operator is necessary, or desirable in most cases, in any of the operations described herein which form part of the present invention; the operations are machine operations. Useful machines for performing the operation of the present invention include general purpose digital computers or similar devices.

[0026] The present invention also relates to apparatus for performing these operations. This apparatus may be specially constructed for the required purpose or it may comprise a general purpose computer as selectively activated or reconfigured by a computer program stored in the computer. The procedures presented herein are not inherently related to a particular computer or other apparatus. Various general purpose machines may be used with programs written in accordance with the teachings herein, or it may prove more convenient to construct more specialized apparatus to perform the required method steps. The required structure for a variety of these machines will appear from the description given.

DESCRIPTION OF THE PREFERRED EMBODIMENT

[0027] Figure 1A illustrates a computer of a type suitable for carrying out the invention. Viewed externally in Figure 1A, a computer system has a central processing unit 100 having disk drives 110A and 110B. Disk drive indications 110A and 110B are merely symbolic of a number of disk drives which might be accommodated

by the computer system. Typically, these would include a floppy disk drive such as 110A, a hard disk drive (not shown externally) and a CD ROM drive indicated by slot 110B. The number and type of drives varies, typically, with different computer configurations. The computer has the display 120 upon which information is displayed. A keyboard 130 and a mouse 140 are typically also available as input devices. Preferably, the computer illustrated in Figure 1A is a SPARC workstation from Sun Microsystems, Inc.

[0028] Figure 1B illustrates a block diagram of the internal hardware of the computer of Figure 1A. A bus 150 serves as the main information highway interconnecting the other components of the computer. CPU 155 is the central processing unit of the system, performing calculations and logic operations required to execute programs. Read only memory (160) and random access memory (165) constitute the main memory of the computer. Disk controller 170 interfaces one or more disk drives to the system bus 150. These disk drives may be floppy disk drives, such as 173, internal or external hard drives, such as 172, or CD ROM or DVD (Digital Video Disks) drives such as 171. A display interface 125 interfaces a display 120 and permits information from the bus to be viewed on the display. Communications port 175.

[0029] Figure 1C illustrates an exemplary memory medium which can be used with drives such as 173 in Figure 1B or 110A in Figure 1A. Typically, memory media such as a floppy disk, or a CD ROM, or a Digital Video Disk will contain the program information for controlling the computer to enable the computer to perform its functions in accordance with the invention. Program and data information from such media is transmitted, in accordance with the invention, over a transmission link in the form of a carrier wave.

[0030] Figure 1D illustrates the use of computers of the type shown in Figures 1A and 1B in a network environment. Such computers can be used as user computers (100, 100') or as servers (192, 193), sometimes with nominal differences of configuration. A user computer may connect to the network 190 either directly (100') or via a network service provider, such as an internet service provider 180. Program and data information used in carrying out the invention can be transmitted as a carrier wave over the network(s).

[0031] Figure 2 is a flow chart of an exemplary pre-paid content hyperlink process in accordance with one embodiment of the invention. When a user requests a document that contains one or more links to content for which payment is required (200), the document is generated (210) by the source server 192. The document can be generated by using a Java servlet or a common gateway interface (CGI) program. In any event, it is generated anew for each access. An exemplary document generation process is described in detail in conjunction with Figure 3. Once the source document has been generated it is transmitted and displayed to the user

220. While viewing the source document the user may decide to click on a link to remote content 230. Remote content is, for example, any content that is not controlled by the sponsor of the page or document being accessed. For example, a link to an additional document that is part of the current site would not normally be considered a link to remote content.

[0032] If the user clicks on a link to remote content the access that is not pre-paid (regular link) then access to that content is handled using standard techniques known in the art 240. If the user decides to click on a link to content for which a payment is required (payment-required content) then the address of the content (regular hypertext link), typically the universal resource locator (URL) or the address, and payment parameters associated with that link (if the link is a pre-paid link) are transmitted 250 to the appropriate destination server 193. When the destination server 193 receives the URL and added parameters, it processes the request for content 260 and collects the payment, by, for example, storing digital cash or debiting the sponsor's account. The processing of requested content is discussed in detail in conjunction with Figure 5.

[0033] Figure 3 is an exemplary flow chart that describes an exemplary the process used to generate a source document in accordance with one embodiment of the invention. In this example a template for a source document is searched for links to payment-required content 300 to which the document author or sponsor desires to provide free access. When one is found the program adds payment information to the link as a parameter 310, thus making it a pre-paid link.

[0034] In a preferred embodiment using HTML, a pre-paid link would have the format 900 detailed in Figure 9. The site identifier would be followed by a specification of the desired page followed by a marker, such as a question mark, 910 which indicates that parameter values follow. The parameter values constitute exemplary payment information. A first parameter in this example is a billing account identifier 920. Next a payment token is generated by the source server 320. The token generation process is discussed in detail in conjunction with Figure 4. The payment token is then added to the pre-paid link 330. In the preferred HTML embodiment the token is added to the billing account identifier 920 and is separated from it by a plus sign 930. The process then repeats until the end of the document file has been reached.

[0035] Figure 4 is a flow chart of an exemplary process for generating payment tokens in accordance with one embodiment of the invention. The exemplary payment token (e.g. Figure 10) is generated by adding a billing account identifier (1010) for an author or sponsor of a document on the server to an empty token 400. The size, in characters, of the billing account identifier is preferably known to both the source and destination processes. In a preferred embodiment the billing account identifier would be left padded with zeros, if nec-

essary, in order to satisfy a fixed size requirement. The token counter is incremented by one and the new token counter value (1020) is concatenated to the billing account identifier. See step 410. The token counter size is also preferably known to both the source and destination processes. In a preferred embodiment the token counter should be left padded with zeros, if necessary, to fulfill the size requirement. The token counter is a software counter or a hardware counter on the source server, which ensures that all tokens generated have a unique value. The token expiration data and time is calculated and this value (1030) is concatenated to the other components of the token (420). The length of time a token will remain valid may be previously agreed upon by the source and destination owners. The expiration date and time may be preferably calculated as the number of seconds after midnight from a predetermined date (i.e., January 1, 1997). The token number (see Figure 10) may be large, in which case it is then converted into a base 36 number in order to compress it (430). Base 36 numbers make use of the digits 0-9 and the letters A-Z. The base 36 number is preferably encrypted using the current site's private key 440.

[0036] Public-key/private-key cryptography is a known technique for providing security when transmitting data over a communications network. Public-private key cryptography is based on a mathematical process that generates two keys where one key cannot be determined from the other. In use, the private key is known only to the user. Typically it is a long series of characters stored on the user's computer. The public key is "published", i.e. it is made available to anyone who wants it. When a user needs to send a secure transmission, the data is encrypted using one of the private or public keys. When the transmission is received the recipient can decrypt the data using the other of the private or public key. The originating site would typically encrypt with its private key and the pre-paid content provider would decrypt using the originating site's public key.

[0037] Figure 5 is a flow chart of an exemplary destination server process for handling requests for content in accordance with an exemplary embodiment of the invention. The destination server (193) first determines if the requested content requires a payment 500. This can be done by querying a database of payment-required URLs on the destination server. If the requested content does not require a payment then the destination server transmits the content to the user 510. If the content requires payment to view or download it and the request has arrived from a pre-paid link, then the destination server parses the source site's billing account identifier and the payment token from the end of the URL (see Figure 9). This parse procedure can be done easily by looking for the characters between the question mark (910) and the plus sign (930). The destination server uses the source site's billing account identifier to find the source site's public key in a database 530. The destination server uses the public key to decrypt the token 540.

The token is then converted back into a base 10 number and the source site's billing account identifier, the token expiration data and time, and the token counter value are parsed out 550. The parse procedure can be accomplished because the size of the customer identifier and token counter are known. The destination server then attempts to validate the token 560. The token validation process is discussed in detail in conjunction with Figure 6.

[0038] Figure 6 is a flow chart of an exemplary token validation process in accordance with one embodiment of the invention. The token validation process, which runs on the destination (pre-paid content provider) server (193), first attempts to match the source site's billing account identifier included in the parameter (920) with the source site's billing account identifier included in the token (1010) 600. If the two numbers do not match, an error message stating the token cannot be recognized will be displayed to the user 610. Any error message given to the user will result in an option to return to the source document to try the link again or to pay for the content themselves 690. If the billing account identifiers match, then the token validation program will check the expiration date and time against the current system date and time 620. If the token has expired then a token has expired error message will be displayed to the user 630. If the token has not expired then the token validation program will attempt to find the token counter in its database of previously honored tokens 640. If the token counter is found in the database then a message stating that the token has already been used will be displayed to the user 650. If the token counter is not found in the database then the token validation program will check to see if the source site has sufficient credit to pay for the transaction 660. Since payment may take many forms the token validation program will first determine the payment type by accessing the customer's account information in the database. If, for example, the customer makes pre-payments then the validation program will determine if enough money remains in the account to pay for the transaction. In other cases the customer may have established credit, in which case the validation program may need to check the customer's credit limit. If the customer is not able to pay for the transaction then a message stating that pre-payments from the source site are currently not being honored, will be displayed to the user 670. If the customer has the ability to pay for the transaction then the token is honored 680. The token honored process is discussed in detail in conjunction with Figure 7.

[0039] Figure 7 is a flow chart of an exemplary process of a destination server honoring a valid token in accordance with one embodiment of the invention. When a token is honored the requested content is transmitted and displayed to the user 700. In addition, the source site is billed in accordance with the payment arrangements made between the source and destination sites 710. If, for example, the source site has established a

pre-paid account with the destination site then the payment for the transaction is subtracted from the amount of money in the pre-paid account. If, on the other hand, the destination site bills the source site on some regular basis then the number of transactions in the source site's account will be incremented by one. In addition to billing, the token counter and expiration time and date are stored in an honored tokens database 720 indexed, for example, by sponsor. As before, time is preferably stored as a number of seconds after midnight on a reference date. This database is used in the validation process 640.

[0040] Figure 8 is a flow chart of an exemplary maintenance process for the honored tokens database. Since tokens should only be kept in the honored tokens database until their expiration time a maintenance program will need to be run on the database at a regular interval (i.e., every hour). First, the current time and date are determined from the system clock 800. Next, the database is queried for tokens that have expired based on the current time 810. Finally, expired tokens are deleted from the database 820.

[0041] Although the present invention has been described and illustrated in detail, it is clearly understood that the same is by way of illustration and example only and is not to be taken by way of limitation, the spirit and scope of the present invention being limited only by the terms of the appended claims and their equivalents.

Claims

1. Apparatus for permitting access to services for which a payment is required, comprising:
 - a. a network port; and
 - b. a computer, connected to said network port, configured to generate a document having a link to services on a network for which an access payment is required and to associate payment information with said link by which access to said services may be obtained without payment by a user following said link.
2. Apparatus of claim 1 in which said document is generated using one of a Java servlet and a common gateway interface program.
3. Apparatus of claim 1 in which said payment information includes one or more of a billing account identifier and a payment token.
4. Apparatus of claim 3 in which said token comprises one or more of a token number, an expiration date and expiration time.
5. Apparatus of claim 3 in which at least part of said payment information is encrypted.

6. Apparatus of claim 1 in which said services includes providing information.
7. Apparatus for permitting access to services for which a payment is required, comprising: 5
- a. a network port; and
 - b. a computer, connected to said network port, configured to provide access to services under control of said computer upon receipt of payment therefore and to extract payment information from a connect received over said network port. 10
8. Apparatus of claim 7 in which said computer manages a database. 15
9. Apparatus of claim 8 in which said database contains account information about one or more customers authorized to provide pre-payment. 20
10. Apparatus of claim 9 in which said database contains information about tokens which have been honored. 25
11. Apparatus of claim 7 in which said computer is configured to check whether said payment information is valid.
12. A method of pre-paying for services accessed over a computer, comprising the steps of: 30
- a. providing an element for performing the step of generating a document containing a link to a service provider; and 35
 - b. providing an element for performing the step of associating payment information with said link.
13. The method of claim 12 in which said service provider provides information for a fee. 40
14. A method of providing a service for a fee, comprising the steps of: 45
- a. receiving an connect request containing payment information over a network; and
 - b. providing the service once said payment information is determined to be valid. 50
15. A system for providing a service for a fee, comprising: 55
- a. a network;
 - b. at least one computer connected to said network and configured to generate a connect request containing payment information; and
 - c. at least one server connected to said network configured to extract payment information received with a connect request and to provide a service when said payment information is determined to be valid.
16. The system of claim 15 in which said service includes providing information.
17. A computer program product, comprising:
- a memory medium; and
 - a computer program stored on said memory medium, said program comprising instructions for generating a document containing a link to a network address and associating payment information with said link.
18. A computer program product, comprising:
- a memory medium; and
 - a computer program stored on said memory medium, said program comprising instructions for receiving an connect request containing payment information over a network and providing a service once said payment information is determined to be valid.
19. A computer controlling product, comprising:
- a memory medium; and
 - a document stored on said memory medium, said document containing a link for connecting to a remote computer said link containing payment information.
20. A computer controlling product, comprising:
- a memory medium; and
 - a document template stored on said memory medium, said document template containing a slot for identifying information for connecting to a remote computer and payment information.

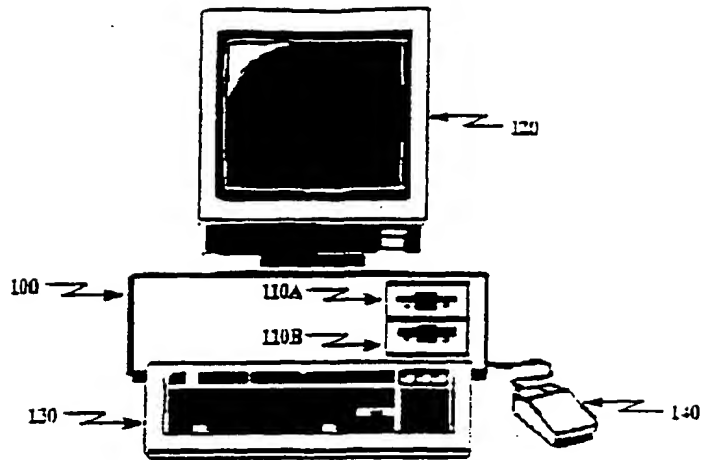


Figure 1A

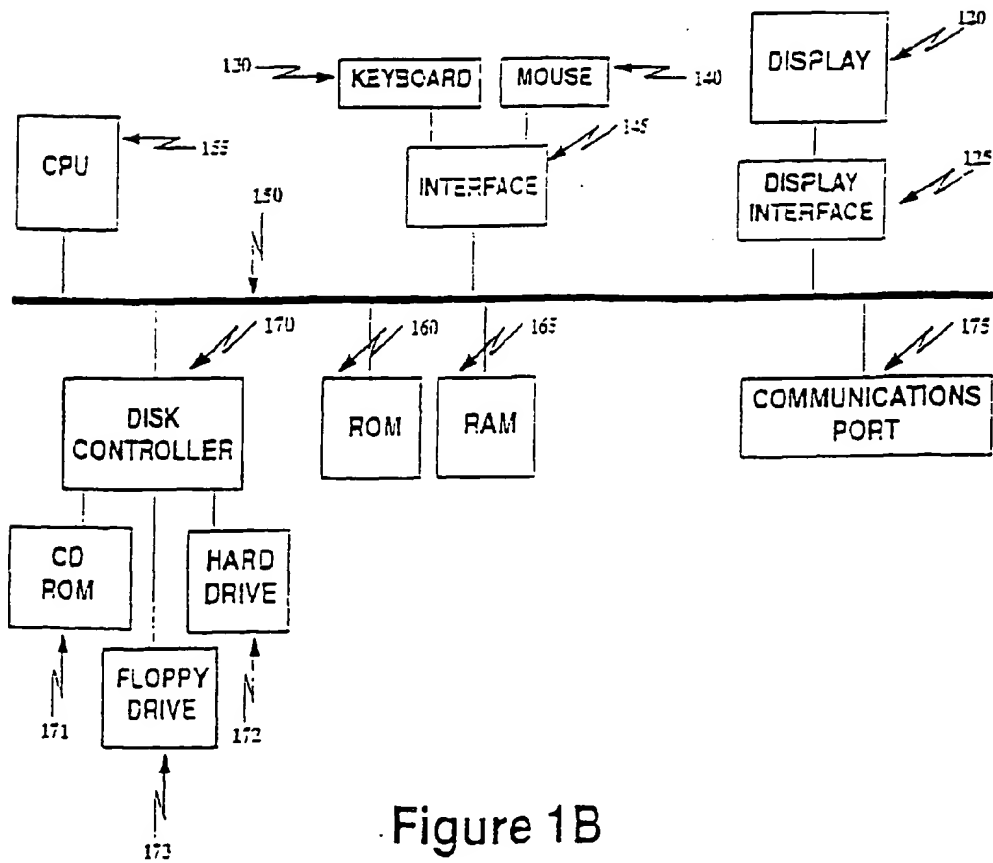


Figure 1B

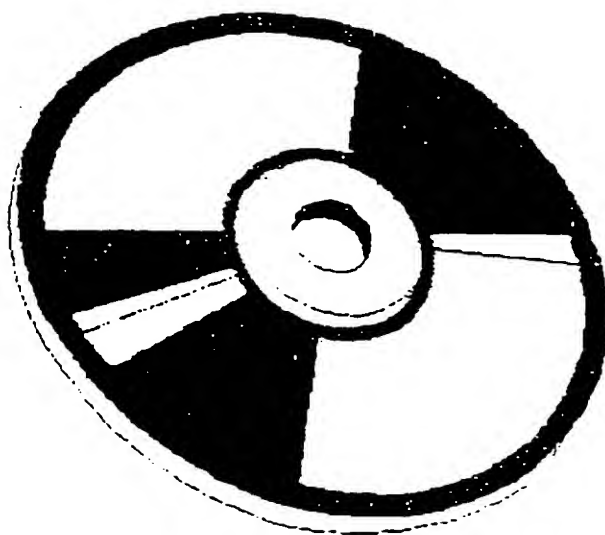


Figure 1C

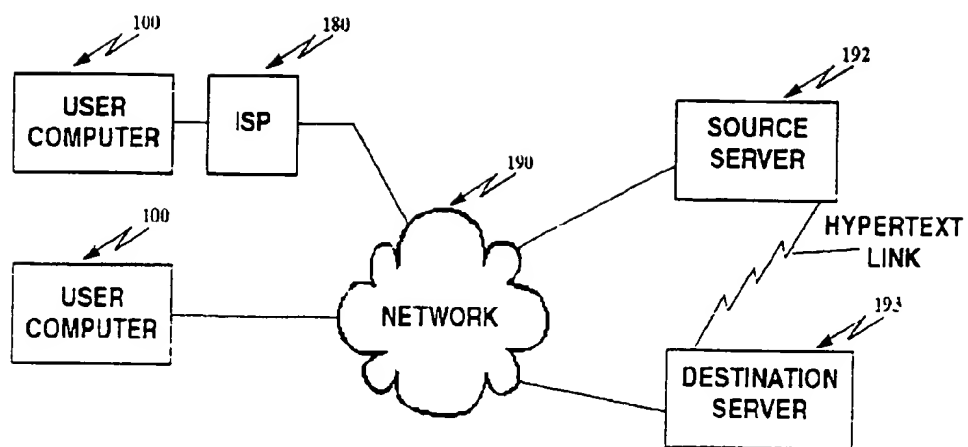


Figure 1D

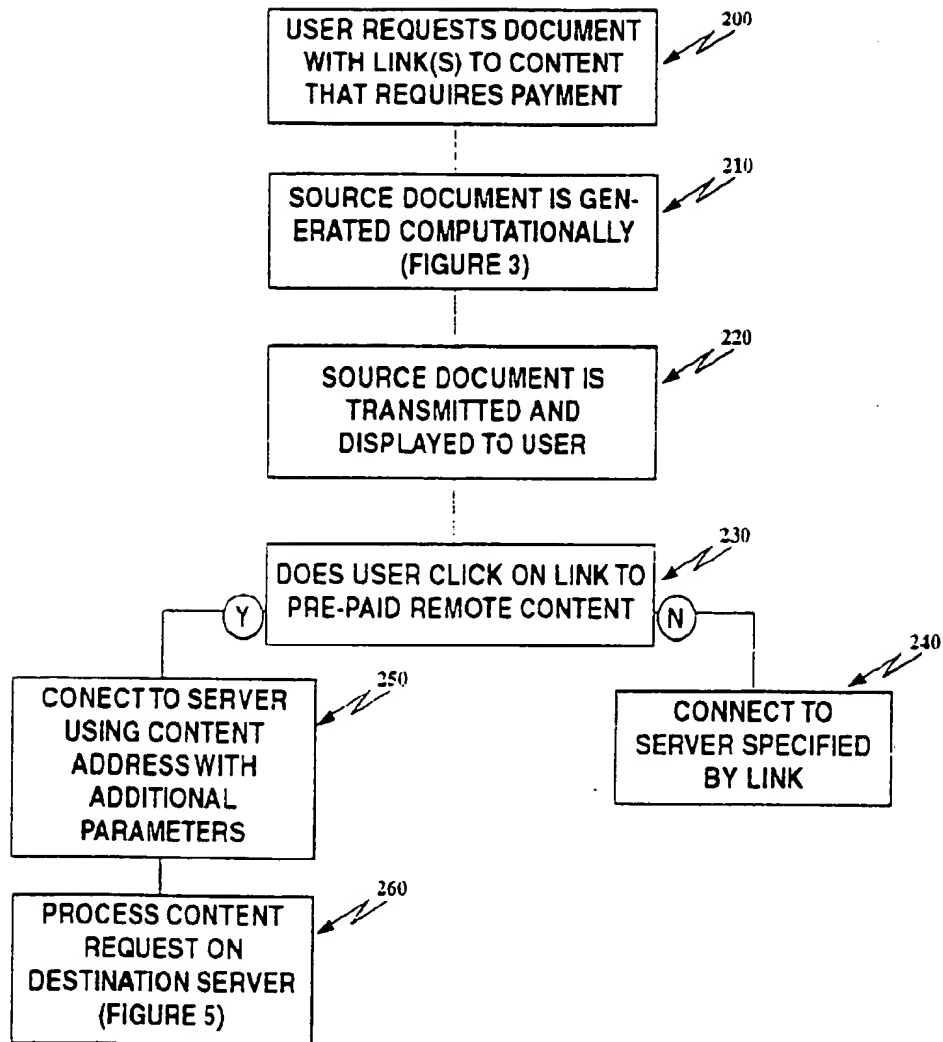


Figure 2

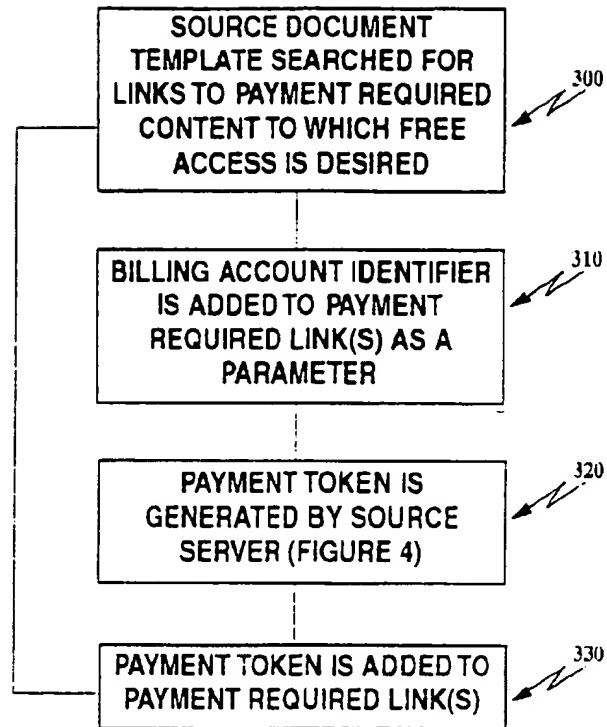


Figure 3

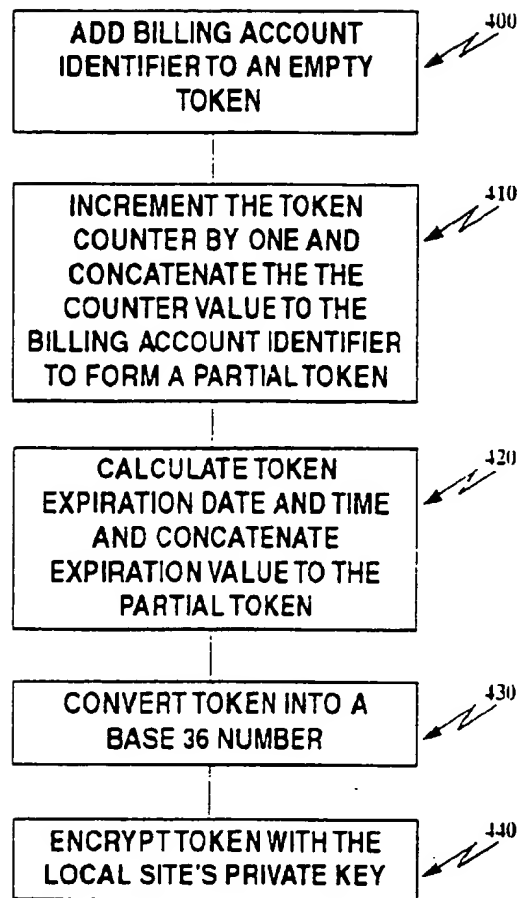


Figure 4

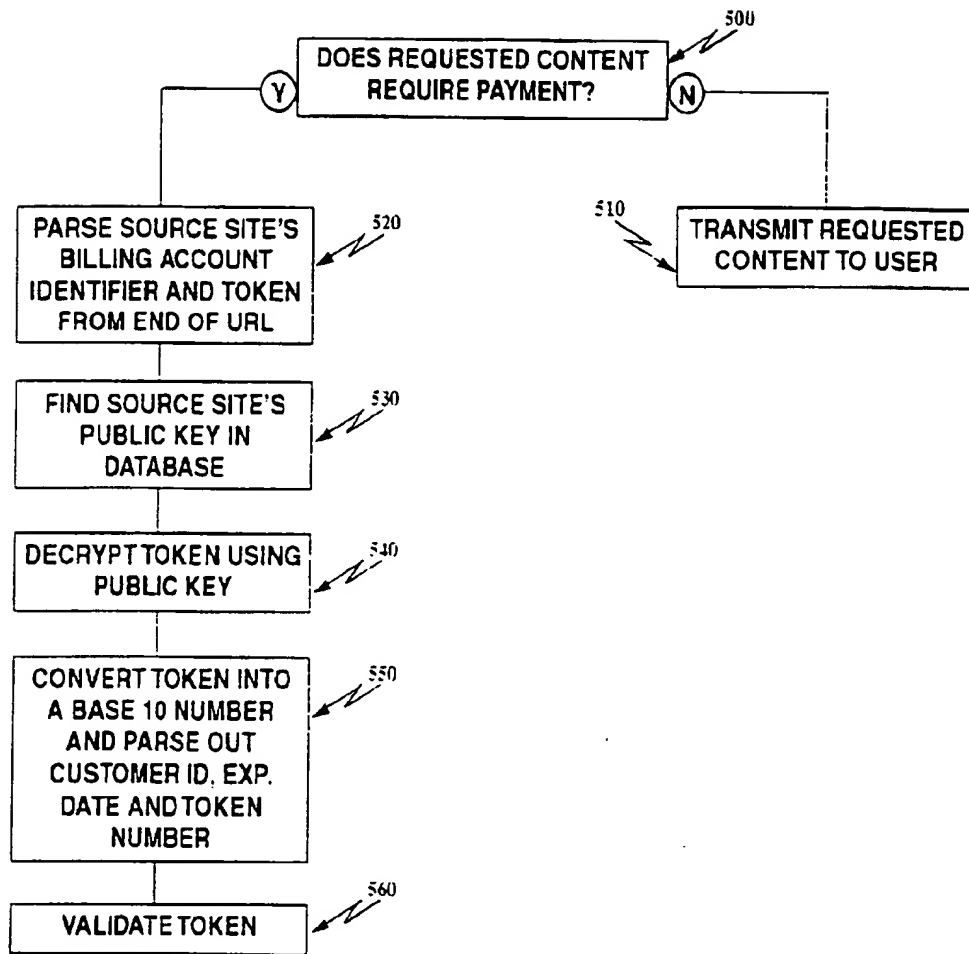


Figure 5

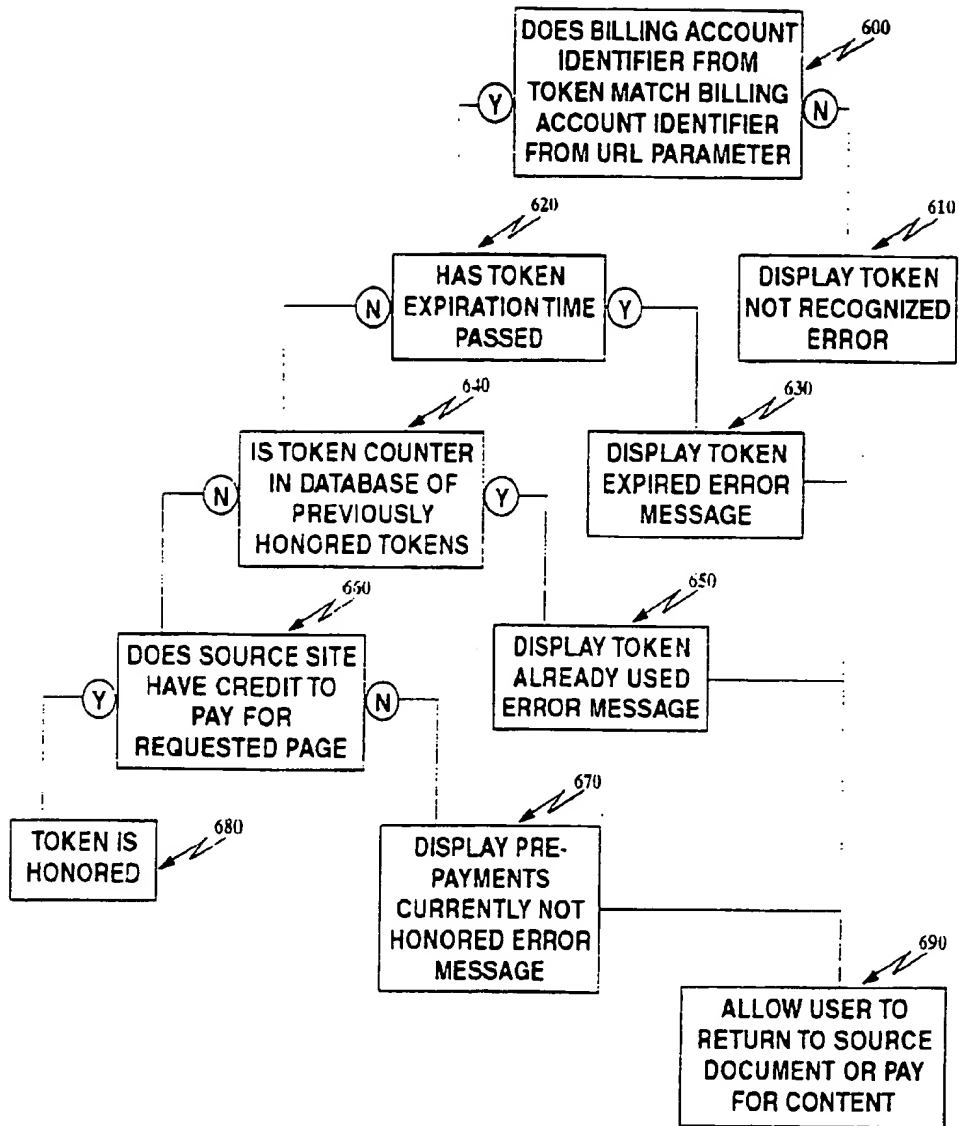


Figure 6

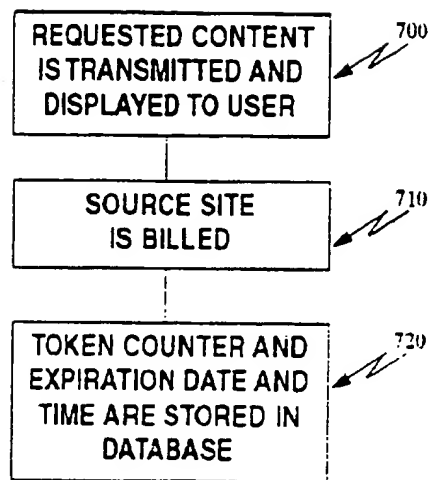


Figure 7

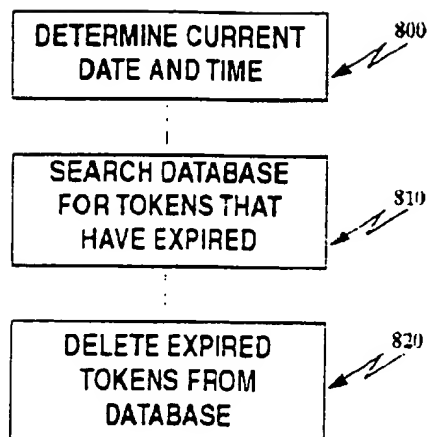


Figure 8

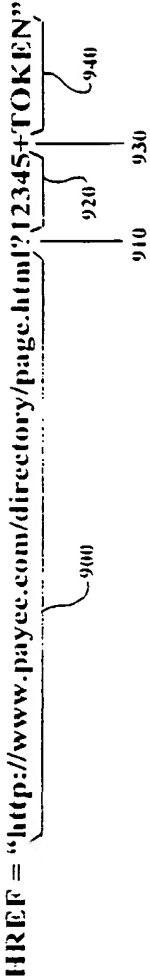


FIGURE 9



FIGURE 10